DOCUMENT RESUME

ED 394 501 IR 017 802

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TITLE Women and Computer Based Technologies: A Feminist Perspective.
PUB DATE 8 Apr 96
NOTE 43p.; Paper presented at the Annual Meeting of the American Educational Research Association (New York, NY, April 8-12, 1996).
PUB TYPE Reports - Research/Technical (143) -- Speeches/Conference Papers (150)

EDRS PRICE MF01/PC02 Plus Postage.
DESCRIPTORS *Computer Uses in Education; Educational Technology; Family Life; *Females; *Feminism; Life Style; *Personality Theories; *Professional Personnel; *Technological Literacy; Work Experience
IDENTIFIERS *Computer Use

ABSTRACT

The use of computer based technologies by professional women in education is examined through a feminist standpoint theory in this paper. The theory is grounded in eight claims which form the basis of the conceptual framework for the study. The experiences of nine women participants with computer based technologies were categorized using three levels: beginning, intermediate, and advanced. Data collection for this study consisted of three interview sessions in which the participants framed and structured the responses. Photographs of people and computers were also used as auto-driving prompts. A cross-case analysis was derived from thematic analysis of each of the nine cases. Themes from the following are discussed: (1) early learning experiences; (2) work context and its relationship to computer technologies; (3) opportunities to acquire knowledge about computer based technologies; (4) daily living experiences within the context of the family and its relationship to computer based technologies; (5) women who have inspired these women to learn about computer based technologies; and (6) thoughts about the effects of computer based technologies on students in present and future classrooms. The original claims in the feminist standpoint theory are then used as a basis for analysis and pattern matching of the data. Conclusions are discussed in relation to the six thematic categories. (Contains 18 references.) (AEF)

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ED 394 501

Women and Computer Based Technologies:

A Feminist Perspective

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Paper Presentation at American Educational Research Association Annual Meeting on Monday, April 8, 1996. Session Title: Women and Curriculum: A Feminist Exploration. Time: 2:15-3:45. Hotel: Hilton. Room: Rotunda. Floor: 3rd.

IR017812

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Women and Computer Based Technologies:

A Feminist Perspective

Quantitative research studies focusing on computer attitude, aptitude, and use in a variety of age groups in many countries, suggest that there are gender-based differences that explain why women exhibit lower levels of computer use. For example, Shashaani (1992) found that there are differences in attitude (interest, confidence and stereotyping) toward computers among high school girls and boys that are significant and reflect gender-role socialization. Okebukola's research (1993) indicated that girls recorded a higher mean perceived anxiety about computer use than boys who had a significantly higher mean score in computer interest. Makrakis's study (1992) of computer self-efficacy and equality in computer competence found significant gender differences regarding computer usefulness and prior computer experience acquired at school, both in favor of males.

However, other studies have found few if any gender differences in computer aptitude, attitude, and use. These studies reveal that there are fewer differences in computer aptitude, attitude, and use among preschoolers and primary grade students than among middle, secondary, and university students, which suggests that as male and female students grow older, more disparities emerge (Webb, 1994; Kay, 1992; McGrath, Thurston, McLellan, Stone and Tischhauser, 1992). Moreover, the contradictory results of research studies

attitude, defined in at least 14 different ways, suggest that there are no significant differences between men's and women's attitudes towards computers (Reinen and Plomp, 1993; Kay, 1992; Ogletree and Williams, 1985, etc.). Also, other research findings indicate that women have demonstrated superiority over men in computer adaptation (Varnon-Gerstenfeld, 1989) and computer problem-solving (Anderson,1987).

Why then, do these opposing research findings coexist? Is there a "conspiracy of silence" (Shakeshaft, 1987) concerning the competencies of women who use computers, work with tools and machines, and are world-renowned scientists and mathematicians? Is there an androcentric bias that pervades and perpetuates the myth of male dominance in a society that proclaims gender equity?

Harding (1991) explores the scientific basis of androcentrism in feminist epistemology. Harding proposes that society assumes that the concepts of women and knowledge--socially legitimated knowledge--have been constructed in opposition to each other. Therefore empirical scientific evidence is dismissed if it does not conform to the androcentric view of science in which the experiences of women are depreciated and neglected. Scientific research and evidence accepted for knowledge claims in our society must be reflected through the male voice and viewed from the male lens. Scientific research and evidence about computer based technologies have been well chronicled about men.

The purpose of this researcher is to investigate the use of computer based technologies by professional women in education through the lens of a theoretical framework that is sensitive to the unique experiences of women.

Feminist Standpoint Theory

Feminist theories are varied, reflecting different philosophical and methodological perspectives. However, they all begin with women's experiences and the ways in which those experiences constrain and shape women's lives. Through the lens of feminist research and theory, the classification of female and male not only defines gender, but also influences the nature and type of personal and professional experiences of women and men. Knowledge is rooted overwhelmingly in the lives of men in our society. There is a need to understand the world through another voice, the women's standpoint. Standpoint theory, which is one of many feminist theories, has strong support in the research of Harding(1991) who has grounded standpoint theory in eight claims. These claims form the basis of the conceptual framework for this study.

Feminist Standpoint Theory-- Claims, Clusters, and Applications.

Claim One: "Women's different lives have been erroneously devalued and neglected as starting points for research and as the generators of evidence for or against knowledge claims" (Harding, 1991, p. 121).

The thematic lens: valuing women's experiences is central to this claim. These experiences include: women's emotional labor, women's relational personality structures, and women's different modes of reasoning. What effect do women's unique perceptions have on their use of and experience with computer based technologies? Have these phenomena been considered in understanding

women's needs, points of view, and concerns relating to the use of and experience with computer based technologies?

Claim Two: "Women are valuable strangers to the social order." (Harding, 1991, p.124)

The thematic lens: strangers in this claim refers to women's unique ability as a subjugated group to discern the hidden cultural agenda and assumptions operating in the dominant society. This cultural agenda and its assumptions have shaped and constrained women's use of computer based technologies through early schooling, adult and peer influences, and career choices.

Claim Three: "Women's oppression gives them fewer interests in ignorance." (Harding, 1991, p. 125)

The thematic lens central to this claim is oppression /knowledge. Women's history of oppression in the dominant society provides them with the opportunity to open up knowledge about gender and its consequences. The manifestations of gender oppression include the social practices of daily life-individual expression; the characteristics of social institutions-structural expression; and all of our patterns of thought -symbolic expression. The sex/gender system influences the experiences of women in the computer culture in relation to denial or access to training, job opportunities, and working conditions relating to computer based technologies.

Claim Four: "Women's perspective is from the other side of the battle of

the sexes that women and men engage in on a daily basis." (Harding, 1991, .126)

The thematic lens: battle gains and losses refers to the achievement of women who attain the true knowledge of social reality, and the personal cost of this knowledge in terms of alienation. As women challenge traditional social conventions in learning to use computer based technologies, they may experience an evolution of feminine consciousness. Have women champions/warriors in their lives inspired these endeavors?

Claim Five: "Women's perspective is from everyday life." (Harding, 1991, p.128)

The thematic lens: women's work asserts that women's work differs from men's work because of the institutionalized sexual division of labor. Women work longer hours and are assigned the kind of work that men do not do. Women's work and gender role relationships need to be examined in the context of the family and the school as it relates to women's use of and experience with computer based technologies.

Claim Six: "Women's perspective comes from mediating ideological dualisms: nature versus culture." (Harding, 1991, p.128)

The thematic lens: accepting differences in this claim refers to women's ways of relating to differences in values, cultural behaviors, and thought processes. Women reject the dualism of the positive-negative polarities of traditional thought

that rests on oppositional thinking. Rejecting gender stereotypes about women who use computer based education who use computer based technologies.

Claim Seven: "Women, and especially women researchers, are 'outsiders within'."(Harding, 1991, p.7)

The thematic lens: seeing from the standpoint in this claim refers to the acceptance of women's lives as starting points for research. Women need not be objects in research, but subjects who are competent knowers of inquiry. Feminist researchers acknowledge that their own perceptions and biases arise from the very same system of social relations that they study. I must recognize that my gender, class, and culture, influence my perceptions and gender assumptions as I study and interact with professional women in education who use computer based technologies.

Claim Eight: "This is the right time in history." (Harding, 1991, p.132)

The thematic lens: theory and science in transition in this claim refer to the fault lines that exist between epistemologies and sciences in times of cultural upheaval. Feminist epistemologies and computer based technologies are frequently in tension with each other. Epistemological biases noted by feminists in computer based activity include: procedural representation of the content to be taught by computers and monological discourse of information presented in computer based instruction. Feminists suggest that computer based technologies can incorporate feminist perspectives. What do women who are professional educators think about the effect of computer based technologies on the students in their classrooms of today and tomorrow?

Participants

There was a purposive selection of women informants at Grant College in order to find the best information sources for this study. The following selection criteria were used:

Women were selected because of their experiences with computer based technologies. These experiences were categorized using three levels: beginning, intermediate and advanced. These are not hierarchical classifications but refer to the range of experience across five types of computer applications. These types of computer experiences include:

1)Experience with computer applications that involves learning with computers for drill and practice, educational games, etc.

2)Experience with computer applications that involves learning with computers and keyboarding skills for wordprocessing and database programs.

3)Experience with computer applications that involves learning with computers and application skills for desktop publishing and graphics programs.

4)Experience with computer applications that involves learning about computers for computer programming and programming languages.

5)Experience with computer applications that involves using computers, communication software, and modems for connection to the Internet, accessing networking links, E-mail and the World Wide Web.

Code Name	Age	Ethnicity	Experience	Married	Children
Professor O'Grady	65	Irish American	30 years of college teaching	yes	7
Miss Lee	24	Asian American	1 year teaching elem. school	no	no
Mrs. Intel	48	Eur. American	25 years Computer Programmer	yes	2
Miss Escuto	27	Hispanic American Dom. Repub.	Day care teacher Sp. Ed.	no	no
Miss Bell	45	African American	20 yrs. Principal	divorced	no
Dr. Goldman	53	Eur. American	Director	yes	2
Miss Garcia	24	Hispanic American Puerto Rico	Student Teacher	no	no
Mrs. Standish	31	Eur. American	5 yrs. teaching Elem school	yes	2
Mrs. Varsaw	35	Recent Eur. Immigrant	Substitute Parochial school.	yes	1

Methodology

Data collection for this study was accomplished using the In-Depth Interview and Interview Guide. Marshall & Rossman (1989) describe the in-depth interview as a data generation technique that is relied on quite extensively by qualitative researchers. It is "a conversation with a purpose". It is an interaction involving the interviewer and the interviewee in which the researcher explores a few general topics to help uncover the participant's meaning perspective, but otherwise, respects how the participant frames and structures the responses.

My first objective was to allow the respondent to tell her own story in her own terms. Detail-oriented, clarification, and elaboration probes were used to deepen the interviewee's responses to questions (McCracken,1988, p.35). During session two I used the stimulus of "auto-driving". This series of planned prompts was used when the categories that had been identified in the literature review did not emerge spontaneously in the course of the first interview session. McCracken (1988) defines this technique as follows: "The respondent is asked to comment on a picture, video, or some other stimulus, and to provide his or her own account of what they see there" (p.36). It is usually the researcher who prepares the stimulus material. This is not a projective technique; "it is a prompting strategy that helps to foreground and objectify aspects of the respondent's experiences that are otherwise difficult to bring to the interview" (p.37).

Photographs of people and computers were selected for use in this study as auto-driving prompts. The following criteria were used in their selection:

1. The photographs depict scenes that reflect life experiences of women and computer based technologies. [The use of photographs that depict women's life experiences have been used in the research of Bunster(1977) to reveal the inner world of feelings, values and significance in the study of Peruvian working women Wex (1979) also used thousands of photographs in her study of women and men in public to demonstrate the differences in women's and men's postures and gestures.]

2. The photographs are used as an auto-driving technique to stimulate responses to the cluster categories derived from the conceptual framework.

3. The photographs were colorful, clear, visual illustrations that tell a story.

The focus of the third interview session was a dialogue with each respondent in which I obtained corrective feedback on previously obtained information. It served as a member check on the data and an opportunity for the respondents to exert control over the researcher's interpretations.

Afterwards, I explained the conceptual framework underlying this study. and asked them for their reactions to the feminist perspective.

The analysis of the data in this study was a process that began with the preservation and collection of data during interview sessions that were taped and later professionally transcribed. Reduction of the data was accomplished through the use of Folio Views, a computer software program that helped in the management and categorization of the data. Coding categories were initially developed from the cluster categories and then modified to suit the new understandings of the data that emerged. As I discovered new codes and created typologies to sort the data a framework of theory emerged. This is what Glaser and Strauss (1967) refer to as grounded theory. The computer software program, Folio Views, stored the data and provided ease of retrieval through the use of Shadow files which left in tact the original transcript. I was able to analyze and highlight coding categories through the use of Query and Highlighter. Thus this computer program permitted a flexible and evolving set of coding categories. Notes on new insights could be easily attached using the icon in the left margin. Miles and Huberman (1994) evaluated twenty two computer software programs.

Folio Views was given a high rating for user friendliness. It was also rated "Strong" on Coding, Search and Retrieval, Database Management, Memoing, and Data linking (p.316). I found this computer program to be all of the above.

Comparison

As researcher I was the "human" instrument in the analysis of qualitative data derived from the interview sessions. In the first stage of analysis the researcher "acts more like an archaeologist, sorting out important material from unimportant material with no attention to how the important material will eventually be assembled" (McCracken,1988, p.44). I used the data from interview session one as an entranceway into the assumptions and beliefs of the respondent. I had to reflect and decide on the coding categories derived from the transcripts. I had to select the photographs that I believed reflected the thematic lenses. My reflections upon a stream of associations evoked by the data helped me to develop insights into the meaning of the data (p. 45).

During the second stage of the analysis process, I employed the seven cluster categories derived from the conceptual framework as a template against the coded categories derived from the data in the first and second transcribed interviews. I searched for relationships or similarities evident in the data. Then I went back to the data derived from the three interview sessions in order to develop a thematic analysis for each case. Patterns and themes sometimes emerged that were appropriate to more than one data strip. I read this material through many many times to try to review my thoughts about the meaning of the words used by

the respondents in the context of our discussions during the interviews. Afterwards the themes derived from each of the cases were categorized using the original research questions in this study.

The third stage was a time of judgment in which I analyzed all the respondents' themes for each of the seven research categories and searched for new understandings. After a lengthy period of immersion and reflection I was able to draw out new understandings from a comparison of each category and the themes that emerged. This is presented in a cross-case analysis derived from the thematic analysis of each of the nine cases. The complete cross case analysis and thematic analysis of each of the cases may be found in its entirety in the doctoral dissertation from which this paper has been written.

The fourth stage of this analytical process involved returning to the original claims in Feminist Standpoint theory as a basis for analysis and pattern matching of the data. Yin (1989) defines pattern-matching as one of the most desirable strategies for case-study analysis: "Such a logic compares an empirically based pattern with a predicted one. If the patterns coincide, the results can help a case study to strengthen its *internal validity*" (p.109). The findings from the cross-case analysis were matched against the claims in order to shed new light on the narratives of women who use computer based technologies. It was at this time that I also found it necessary to bring together several of the claims that were similar.

Cross-case analysis

Themes From Early Learning Experiences

The early beginnings of these nine women of the computer generations were strangely similar although they came from a variety of ethnic, racial, and religious backgrounds: Eight women were born in the United States; Mrs. Warsaw immigrated from Europe. The eight women born in this country remembered their early schooling experiences because of the admiration they had had for the teachers who inspired them: Three of these women remembered their early childhood teachers. Three of these women referred to teachers who inspired them when they were in public elementary schools. But Dr. Goldman referred to her elementary school teacher in the Yeshiva and Professor O'Grady, recalled the nuns who had been "inspirational of intellectual life" in high school.

Seven of these women, including Mrs. Varsaw, expressed the childhood dream of becoming a teacher. Mrs. Intel, however, wanted to be a scientist although she knew no scientists. Interestingly, seven of the women did not recall learning science or remembered science classes in which they only read about science. Miss Bell was the only respondent who described "hands-on" science lessons. Dr. Goldman stated that she wanted to be a "wanderer" and travel the world.

What were the reasons for these children's early connections to their teachers? Seven of our respondents described their emotional connections with

their elementary school teachers in terms of the support, trust, and self-esteem that these teachers gave them. For example Professor O'Grady described her encounter with a nun, in the library in junior high school, who also awakened her to a new sense of self by associating her name with a famous Irish queen.

The respondents' emotional connections to their teachers endured across the expanse of many years. Positive emotional connections were also evident in the strong relationships that these women had with their mothers. Many of these mothers were not intellectual women. They were factory workers, housewives, and newly arrived immigrants who trusted and encouraged the dreams of their children. However, three of our respondents described negative mother-daughter relationships. Professor O'Grady remembered the constant berating of her mother who wanted her to stop wasting time studying. Mrs. Intel recalled: "My mother loved me but didn't inspire me because she was too passive" Mrs. Escuto revealed that her mother cooked daily meals and brought them up to her apartment because she did not live with the family. But she referred to her aunt, not her mother, as the inspirational woman in her life. Since these women had effective teacher role models whom they wished to emulate, why did six of the nine women begin their studies and careers in business?

Most of these women were limited in their choices by economic constraints and family tragedies. Professor O'Grady emphasized that there were "no choices" since her father was ill and there was no carfare to go to college. Mrs. Intel was

limited in her choices by family problems, illness, and death. She did not fulfill her desire to study architecture but studied computer programming so that she could obtain employment and help with the financial needs of her family. Mrs. Varsaw's credentials as a teacher in Europe were not accepted in America, consequently she went to a technical institute to become a secretary. Miss Lee, and Miss Escuto also majored in business studies to help with the family income although they did not feel comfortable in this environment. Mrs. Standish was not limited in her choices during her early years because of her famous father's sports career. But her college years were very difficult after her parent's divorce because she had to work to support herself through college. She decided to major in international business and accepted a job in investment banking.

The early years of these women revealed inspirational teachers and strong emotional connections to their mothers and teachers. But the childhood dreams of becoming teachers had to wait for many years to be fulfilled.

Themes From The Work Context And Its Relationship To Computer Technologies

The work experiences of these women were many and varied; nevertheless seven of the nine women described aspects of discrimination that they had encountered as women in the workplace. Four of these women described verbal

and financial manifestations of discrimination in the business world. Professor O'Grady and Miss Escuto described discriminatory practices in offices and on the job at the college and pre-school level. Interestingly, Miss Lee perceived the discrimination that she experienced in her role as elementary school teacher as age discrimination. She thought that she was not respected because she was one of the youngest staff members. It is to be noted that most of the respondents who worked as teachers at the elementary school level perceived no discrimination in promotions or salary, based on gender. This may explain why Dr. Goldman whose school and work experience were at this level, stated that she never encountered discrimination on the job. Miss Garcia was not included here because she had not graduated and did not have any previous outside work experience. Miss Bell stated that she was appointed principal because the district office personnel were looking for a woman as a result of legislation that provided equal opportunity to women and minorities. But once on the job she stated, "women have to prove themselves more than men in leadership positions."

The awareness of discrimination in the workplace did not end at the personal level. Five of the eight respondents were acutely mindful of the unjust and discriminatory practices happening in their work environment. Professor O'Grady described the differences in computer use that she noted in schools in disadvantaged and affluent neighborhoods. Miss Bell noted that the computers in her school's computer lab were obsolete and that this would prove a disadvantage

to her youngsters who lived in the inner city. Miss Intel described her aversion to the bigotry of the villain in the business world whose practices led her to leave the company. Mrs. Varsaw, Mrs.; Intel, and Mrs. Standish noted the need for trained computer teachers in their urban elementary public and parochial schools. They realized that the children would not develop computer skills that could enable them to compete for jobs in the future by observing the computers on display in these schools.

All of the women in this study used the computer for word-processing reports, letters, etc. Mrs. Intel used the computer for statistical applications of math scores in her role as intern in a public school. Miss Bell, and Dr. Goldman used the computer to access the Internet to find funding. Miss Lee had the ability to use the computer for desk-top publishing but she had no access to computers on her job. Access was also denied to Mrs. Varsaw and Miss Escuto. Mrs. Standish, however, found no computers in the first school she taught in and "a ton of computers" in the second school she was transferred to. She noted many practical applications for computer use: teaching math through Logo, learning to use the Write to Read program, and accessing the Internet to share ideas with other teachers. Her future dream was to return to the third school she had worked in before leaving to have her baby. She was inspired by a dream to go back and set up the computer lab so that these children would have a chance to learn computer skills. Professor O'Grady expressed a similar wish to reverse discrimination and

go back to teach in an elementary school where she would teach little girls not to be afraid of frogs and things.

Eight of these women who are now teaching expressed satisfaction in the job they were doing and stated that they would continue teaching even if they had the possibility of a second career choice. However, Miss Garcia who had not started on her teaching career stated that she would have loved to work with computers if she had had a second chance to choose.

These women have experienced discrimination in the workplace because they are women. They have also become sensitized to the injustice and unequal treatment of other colleagues and the children they teach. Did these professional women in education have equal access and opportunity to learn computer based technologies?

Themes From Opportunities To Acquire Knowledge About Computer Based Technologies

These nine women of the computer generations learned to use computers at various ages and stages of their lives. Three of these women had opportunities to begin to learn computer skills while they were in the sixth grade. Miss Escuto's opportunity opened when her freshman class in high school was randomly chosen to learn BASIC, a programming language.

Professor O'Grady and Miss Bell learned about computers in their college years. Professor O'Grady used the mainframe for the statistical analysis of her doctoral dissertation; Miss Bell learned to operate the computer as part of a job working with literacy students at the college. Mrs. Intel, who at 48 years of age was Miss Bell's contemporary, studied computer programming after high school. She took courses in an adult education program and began her computer experience on a mainframe.

Mrs. Varsaw and Dr. Goldman recently learned to use computers. Mrs. Varsaw was introduced to computers at a technical institute while Dr. Goldman enrolled in a course in adult education.

Five of these women were once employed in jobs working with computers. Three of these women worked in the business world. Miss Bell and Miss Lee however, worked in the college. Interestingly, four of the five women who worked with computers on the job described a large time gap during which they stopped using computers. Miss Escuto also indicated that many years had passed before she began to use a computer again. What were the reasons for this time gap in computer learning? Finding the answer to this question begins with a review of the respondents' descriptions of how they learned to use computers.

Five of the respondents said that they used logical reasoning to learn about computers. Four of the respondents said that they used intuitive reasoning to learn about computers. However, seven of the nine respondents described experiential

learning methods: trial and error, figuring it out, working it out, following my intuition, etc. Mrs. Intel and Mrs. Varsaw, however, learned their computer skills through formal study programs.

These respondents were motivated to learn experientially because of the need to use computers in college and on the job to write reports, evaluations, journals, etc. These were practical applications using word-processing skills. Moreover, these women were encouraged by male links to their computer learning that helped to span the time gaps in these women's computer experiences.

After many years had passed Professor O'Grady began to learn to use a desk-top computer with the help of the young man in the faculty computer center who came to her house to reorganize the icons on her screen. Fifteen years after Miss Bell's college computer course, she was motivated to continue to learn about the computer when her school became an ATS school. She received help from a male teacher and a male supervisor at her school when she wanted answers to questions about computers. Miss Escuto recalled that as a teenager she no longer felt comfortable among her brother's computer friends. But it was this brother who motivated her to start learning again after many years when he bought her a laptop computer. Mrs. Standish found help from "computer nerds" working in the Economics lab when she was a college student. Many years later, she bought a computer and taught her husband how to use it. As time passed however, he began to share the "new things" that he has learned about computer programs.

Dr. Goldman and Mrs. Varsaw were also motivated to learn because of practical applications on the job and at the college. Dr. Goldman hired a male student who was a computer major to tutor her so that she could add graphics to the resource guide she was writing. Mrs. Varsaw received help in accessing information for her college reports from a young boy who was her neighbor's child. Interestingly, Miss Lee stated that her uncle graduated as a computer programmer but she never spoke to him about computers. She said, "I am not one to talk about it." Professor O'Grady, Dr. Goldman, Miss Bell and Miss Escuto made the same comments. Some of these women even suggested that there were differences in the way males and females learn and talk about computers.

Miss Escuto suggested that men can talk about computers for a much longer time than women can. Miss Lee indicated that women are more familiar with life experiences, not technical things like computers because they are pushed into maternal activities. Mrs. Intel observed that boys have more confidence and take chances but girls don't feel comfortable having fun. She noted that the boy high school interns were learning about the computer by playing games. The girl intern excluded herself from this type of learning. Mrs. Intel believed that "girls were more dutiful" which prevented them from learning through games.

These professional women had access and opportunity to gain computer knowledge. They had taken computer courses and described their learning methods as experiential. They were helped in these endeavors by male friends, co-

workers, and family. Some of these women worked with computers in the business world and at colleges. But, their progress was not linear. There were time gaps that necessitated relearning computer skills. Although Mrs. Intel became a computer programmer, our other respondents did not have long range computer learning goals. They were motivated by more practical considerations of how the computer could aid them in their job or in their studies. Was this because there were differences in the way men and women perceive the use of computer based technologies? These women's daily lives may provide answers to this question.

Themes From Daily Living Experiences Within The Context Of The Family And Its Relationship To Computer Based Technologies

These professional women of the computer generations worked in three different settings during a twenty-four hour day. They divide their time between the home, the school and community activities. However, this distribution of time was not always predictable. Five of these women were married. Two of these women had younger children to care for. Four of these women were single but only two lived alone. All of these women indicated that they did not employ household help; they were responsible for the daily care and nurturing of the family. Two of the five married women indicated that their husbands were willing to share in certain household chores. All of these women, however, cooked,

cleaned, shopped, and did the laundry for themselves and their families. The daily requirement of providing material and maternal benefits to a family is only exceeded by the demands of a job that also require responsibility for the teaching and learning of students.

Eight of these nine women worked eight or more hours a day in schools or colleges. Mrs. Standish was working in a school but is now on childcare leave. Miss Garcia was student teaching in an elementary school. Five of these women hold second jobs after school and/ or on weekends. Eight of these women were taking college or business courses in the evening to complete a degree or update their professional skills. Professor O'Grady and Dr. Goldman also indicated that they were writing a text book and a resource guide for teachers during their spare time.

Two of these women, Miss Garcia and Miss Escuto, devoted one day a week to their church where they taught classes in religion. Mrs. Varsaw also indicated that she would soon become very active in the parochial school once her daughter entered first grade there next semester.

When do these women use computer based technologies? Five of the women who have computers at homework on their computers in the very late evening and/ or on weekends. Most of the work involved the use of the word-processing of reports and letters relating to their jobs. Professor O'Grady, Miss Bell and Dr. Goldman own new multimedia computers that they use to access the

Internet through America On-line. Demonstrations for family and friends usually motivated this use. Three of these women introduced their husbands to computer based technologies and were helping them with their computer work: Mrs. Standish worked one day a week at her husband's office on Microsoft Excel spreadsheets. Mrs. Intel's husband brought home his computer work from the office and she used Lotus to update his programs. Professor O'Grady had prepared a special word-processing file for the letters she has typed for her husband.

Time management is an essential factor in learning about computer based technologies. But these professional women in education had priorities: their families, their jobs, their coursework, and their church activities. When did they have the time to surf the Internet or explore the World Wide Web? How could they be challenged to reorganize their priorities so that time would be given to learning more about computer based technologies? Computer networking has been suggested as one possible strategy to achieve this objective.

Themes From Women Who Have Inspired These Women To Learn About Computer Based Technologies

These women of the computer generations lived in varied domains and engaged in many conversations with women throughout the course of a day's activities. In fact, Miss Bell stated, "women socialize better with other women and

even men like to talk to women on that kind of level because men don't talk to each other in deep situations as easily as women tend to do." This statement while true on many levels is certainly not true when the subject is computer based technologies. Four out of the nine women described networking with female family members. Professor O'Grady communicated with five daughters. Miss Bell spoke with her aunt, cousin, and two sisters. Miss Garcia networked with two sisters and Miss Lee spoke of a sister who used computers. Four out of the nine women also networked with friends. Mrs. Intel, Mrs. Varsaw and Miss Escuto each named two friends. Mrs. Standish described one friend who used computers. Five of the nine women were able to name female workers who used computers: a colleague, a teacher, a secretary and a principal. Mrs. Varsaw was also able to name two neighbors. However, three of the nine women could not name a third women they know who used computers. Interestingly, the conversations that were described by the respondents were not about using computer based technologies or sharing new programs but they revolved around other friends and family members' experiences with computer based technologies on the job and in the home. Mrs. Intel was the only respondent who said, "I went to talk about technology and what's really happening."

Computer networking is a motivational impetus to learning. The sharing of information about computer programs and applications may result in new understandings and a continued desire to learn more. Eight of the nine

professional women in education who use computer based technologies have not had the opportunity to network about new programs that would stimulate new interests. If Miss Bell was inspired by observing women she did not know, what achievements would be possible if she were linked to a network of women using computer based technologies: "I'm mesmerized when I travel by plane and see other women just whip out a laptop and get things done. They're so productive; it fascinates me."

It is significant to note that all of the nine women who use computers have family members who also use computers. Although four of the nine women networked with female family members who use computers, six of the nine women networked with male family members. Mrs. Intel and Dr. Goldman have sons who used computers on their jobs; Mrs. Varsaw and Miss Escuto networked with brothers while Mrs. Standish networked with her husband.

The theme of computer networking surfaces again in the respondents' predictions on the effects of computer based technologies on students in the classrooms of today and tomorrow.

Themes From Thoughts About The Effects Of Computer Based Technologies On Students In The Classrooms O Today and Tomorrow

These nine women professional educators of the computer generations described incredible technological changes that would result in future years, but

they were very concerned about the present and future negative effects of computer based technologies on students.

Eight out of our nine respondents warned of the sedentary, addictive and isolated lifestyles of students whose time was spent alone playing with computer games. Mrs. Standish also foresaw the importance of monitoring access to the Internet by teachers, parents, and government officials so that the programs children access would have appropriate rather than indecent content. Eight of the nine respondents emphasized the need for emotional connections to other children in the lives of their students.

Eight of these nine women also agreed that the emotional connection provided by the interaction of student and teacher was the primary reason computers would never replace teachers. Mrs. Varsaw also suggested that the teacher's role was not only to socialize children but also to teach beliefs. Miss Garcia however, thought that computers would replace teachers in the next twenty-five years.

All of our respondents described the fast pace of living that will be accelerated by computer based technologies in the future. Moreover, they all agreed that the choices presented to girls would be greater in the future in terms of career choices that would reverse present day gender stereotypes. However, two of our respondents warned of the great rift between women who were computer literate and those who were not. Dr. Goldman stated, "The effect of computer

technology would be to create more of an upper and lower class." Mrs. Varsaw predicated that competition would be "terrible for jobs" in the future and that girls who did not have computer skills would have "very difficult lives". Interestingly, Professor O'Grady and Miss Lee shared the hope that computer based technologies would give women and men the choice of working at home rather than in offices to "free up" time and "do the family thing".

Computer networking was discussed by two of our respondents. Mrs. Standish saw computers as "an incredible resource linking schools across the country so that teachers can share ideas." Principal Bell, however, suggested more "fantastic" changes in her prediction that one day our children will be communicating by computers with someone on another planet.

Miss Escuto observed that there was a "breakthrough for women today" Women students were taking initiative, making choices, and succeeding in fulfilling their dreams. She cautioned however, that they needed to be "praised" and supported in these endeavors.

Focusing the Lenses of Feminist Standpoint Theory On The Narratives of Women Of The Computer Generations

Feminist Standpoint Theory, which has been grounded in the claims of Harding (1991), will be employed in this section in an attempt to shed new light on the narratives of these women who use computer based technologies. Claim one

suggests that valuing women's daily life experiences in research studies will provide new insights because women's perspectives are unique. They have been shaped and constrained by life experiences determined by their gender.

These women's early learning experiences, viewed from the feminist perspective, began with their socialization as girls according to predetermined patterns of the sex-gender system. The attachment to their mothers and female teachers may be seen as evidence of women's relational personality structures that conform to the pattern of female not male. Conformity to cultural stereotypes was also evident in the respondents' descriptions of childhood games: playing house and school. This training of the female in preparation for future roles as housewife, mother, and teacher also extended to learned patterns of thought such as empathy and sensitivity to the needs of others, which must be given priority over one's own needs. However, three of our respondents in this study describe events that did not conform to this cultural pattern: Professor O'Grady, Mrs. Intel, and Miss Escuto refused to recognize their mothers as role models. Interestingly, these three women also stated that their choices of careers were independent decisions that were not influenced by others.

The early learning experiences of these women in elementary school also varied. Three of these girls, Miss Lee, Miss Garcia, and Miss Standish had opportunities to learn about computers in sixth grade. Miss Escuto was introduced to computers in her freshman year of high school. Feminist standpoint

theory would assert that the political changes that occurred as a result of the Feminist Revolution changed the curricula in many schools and opened up opportunities in science, math, and technology once reserved for boys. However, this was not true of the elementary science curricula. Eight of the nine respondents, whose ages spanned over forty years, reported the same findings: their science classes consisted of lectures or the reading from a text. This did not generate an interest in science. Mrs. Intel, whose childhood dream was to become a scientist, recalled "Nada, zip, nothing" about her science elementary science classes. These girls were not motivated to engage in experiential science learning in elementary school.

Feminist standpoint theory states that women are strangers in the world of business that is dominated by the values and beliefs of men in power. The oppression experienced by women who have chosen to leave the home for a career in the business world is well documented in the narratives of women of the computer generations. Our respondents majoring in business or working in the world of business reported incidents involving sex discrimination. Many of the respondents also described feelings of not belonging in the world of business. For example, Professor O'Grady's commented, "I am not a policy form person so I left insurance to go into teaching." Miss Lee stated, "I couldn't see myself sitting in an office for the rest of my life" Mrs. Intel whose first career was as a computer programmer felt compelled to leave two positions because of her reluctance to be

a part of the prejudice and discriminatory practices that were prevalent in the workplace.

However, it is significant that six of the nine women who majored in business or worked in the world of business had the opportunities to use computer based technologies in college courses and in their careers. This was most important because these experiences not only introduced Mrs. Intel, Miss Bell, and Mrs. Varsaw to computers but also closed the learning gap of Miss Lee and Mrs. Standish who were introduced to computers in elementary school.

Feminist standpoint theory describes the subordinated status of women in the family. All of the women in our study were responsible for household chores. Mrs. Intel was the only respondent who indicated that her husband shared equally in household tasks. Eight of our respondents worked outside the home for eight or more hours a day. Professor O'Grady, Miss Bell, and Miss Lee reported that they have other jobs in the late afternoon and evening. Miss Escuto and Miss Garcia also devote one evening a week to teaching in the church. Two of these women, Mrs. Standish and Mrs. Varsaw, also care for very young children. Miss Garcia and Miss Lee, although not married, care for younger brothers and sisters. The subordinated status of women obligates them to accept these responsibilities as natural. The time that is needed to learn about computer based technologies must be taken out of these very long and busy days. But since this time is devoted to personal growth it does not take priority over family, work, college, and church.

Therefore one of the major problems for women in learning to use computer based technologies is isolating the time to learn.

Feminist standpoint theory also stated that women experience battle gains and losses in this age of science in transition. These women's use of computer based technologies may be considered "gains" in a society where women's place was in the home. But the "losses" are also recognizable in terms of limitations of computer access and opportunity. Professor O'Grady has no access to computer based technologies in her office or in the college classrooms where she teaches the future teachers of tomorrow. Mrs. Intel, who was a former computer programmer, works on a word-processing program in the science lab at Grant College. Why has this woman who has such capabilities not been asked to work with students who need to develop their computer skills? Miss Bell is the principal of a school and an adjunct professor whose classes meet at her school in the evenings. If her school had computers with access to the Internet she could have her elementary school students and staff learning computer skills during the day and her college students developing stategies to teach curriculum via the Internet in the evenings. Mrs. Varsaw, Miss Lee, and Mrs. Standish no longer have access to computers at home and therefore have no opportunities to extend their computer knowledge. These three women are teachers in elementary schools but their computer learning is not recognized or utilized for the benefit of the children or the staff. Miss Escuto and Miss Garcia have often expressed interest in learning

more about computers. But Miss Escuto is limited by her laptop which does not have Windows or a modem. Miss Garcia has a Commodore that is already obsolete. Dr. Goldman, Miss Bell, and Professor O'Grady have state of the art computers at home. But they need the time and the incentive to explore the Internet and the World Wide Web.

Feminist Standpoint theory supports a feminist perspective in a world of great technological changes. Although all of our respondents recognized the importance of this revolution for women's rights and the abolition of gender biases only three of our respondents considered themselves feminists. Five of our respondents did like the limitations imposed on their choices by difficult and divisive feminists. Interestingly, most of our respondents had dual perspectives on the feminist perspective. As women with daughters they wanted these advantages for their girls, but as women with husbands and sons, they recognized the importance of maintaining the status quo.

Conclusions

This study of nine professional women in education who use computer based technologies demonstrates the importance of listening to women as they reflect upon their life experiences and computer based technologies. Valuing women's lives in this research has produced significant understandings relating to the original research questions:

The early learning experiences of these women have affected their use of computer based technologies in three distinct ways:

Their early training at home and in school has focused on the care and nurturance of others. This was evident in the games they played, the careers they chose, and the role models they followed. The pattern of thinking that resulted from this training had centered women's thoughts on family, work, and community activities as the first priorities in their lives. Personal growth and development were assigned a second place.

The early education of these women has reflected the stereotypical beliefs about females in our society. Science and math classes involving experiential learning were not available for most of these women in elementary school. In fact, their early educational experiences did not provide these young girls with role models other than female teachers. Moreover, many of these elementary school teachers inspired these women to follow similar careers through the strong emotional connections made in childhood.

The early introduction of these women to computers was sporadic reflecting a lack of planning and defining of long range goals. Three of the students introduced to computers in the sixth grade were given cursory learning experiences by teachers who were not trained. Sometimes one computer was available for an entire class to use and on other occasions five or six children shared one computer. However, these three students were fortunate to be at that

juncture of time and place when computers were introduced into the school setting.

These women have described their work context and its relationship to computer based technologies in terms of preparation, access, and opportunity to learn and use computer based technologies.

Respondents who started their studies as business majors were taught computer skills. Those respondents who began their careers in business also had access and opportunity to use computers in the workplace and they were encouraged to continue learning on the job. However, the discrimination they experienced as women in the business world and their need for emotional connections were decisive factors in their decision to leave that field to become teachers.

Respondents who entered the Graduate Program in Education at Grant College were offered courses in Word-processing, Logo and Desktop Publishing. They also had access to the computer lab; however, most of these women did not take advantage of this opportunity because they were uncomfortable in this setting.

Respondents who worked in schools and colleges expressed frustration at not having access to computers in the classrooms where they taught. The principal in this study did have access to a computer in her office. Moreover, the senior professor in this study was not given an office computer although she expressed a

definite need for one. However, she did have access to the faculty computer lab and to a computer programming course offered by the college.

These women have described their daily living experiences within the context of the family and its relationship to computer based technologies. They have discussed access, opportunity, and male links to learning.

Access to computer based technologies at home varied. Four respondents owned state of the art computers, two respondents owned obsolete models and three respondents were unable to purchase computers because of financial considerations.

Opportunity to use computer based technologies at home were limited for all respondents because of the time devoted to their family, their jobs, their coursework and their community activities that had first priority. Therefore time gaps were evident in their computer learning experiences because in the busyness of their daily lives these emotional connections held preeminence.

Male links to computer learning in the family were described by six of the respondents in this study. These women connected to brothers, sons, and husbands who motivated and shared their interests in computer based technologies. Interestingly, three of the respondents' husbands were introduced to computers by their wives who used their computer knowledge to help their husbands in work relating to their jobs.

These women described networking with other women who use computer based technologies in the neighborhood, the office, the school, and the church. Interestingly, while these women shared with other women the concerns and life experiences of family and friends relating to computer based technologies, the shared knowledge of technical aspects of using computers was usually discussed with men. The reason for this may be attributed to the male teachers, brothers, sons, and colleagues who supported them in their computer learning experiences. However, most of these women described experiential learning methods as they explored computer software programs: trial and error, figuring it out, working it out, following my intuition, etc.

These professional women in education described positive and negative effects of computer based technologies on the students in their classrooms of today. They also predicted incredible technological changes in society and in the life styles of students of the next generation resulting from the use of computer based technologies.

They emphasized the importance of computers for word-processing reports, evaluations, and journals in classrooms today. Specific computer programs such as Write To Read and Logo were considered meaningful alternatives to traditional learning materials. Telecommunications including the ability to access the Internet, engage in chat sessions, and share ideas through

Nicenet were highlighted as examples of positive effects of computer based technologies.

These women also warned of the sedentary, addictive and isolated lifestyles of students whose time was spent alone playing computer games for many hours during a day. They saw the need to regulate and monitor computer on-line programs with adult content so that students would have access to appropriate rather than indecent information. They also emphasized that computer based technologies could not substitute for the emotional connections to other students and teachers that must be made if the educational community is to survive.

These women predicted an even faster pace of living that will be accelerated by computer based technologies in the future. They predicted many new choices for girls who were computer literate that would reverse gender discrimination and create new work options. However, they saw a great rift between girls who have computer skills and those who do not which would lead to the division of society into upper and lower classes based on the criteria of computer literacy. These women predicted incredible technological changes in a world where a student would communicate with someone on another planet. These changes are beginning now!

In today's information society computer literacy is no longer an option. Educators need to prepare their students to function in a world where distance

learning and telecommunications are now accessible. This technological revolution is changing the future of teaching and learning.

The proliferation of computer technology requires opportunities for women to access computer training. Classrooms and computer labs in some schools now have computers with multimedia capabilities: CD-ROM drives, Sound cards, and modems.

Computers are the tools of the future. In this information age where computer based technologies are changing every aspect of our daily lives, it is imperative that professional women in education be computer literate. Young women must be trained in this field without the onus of considering it a male domain.

Studies of the lives of professional women in education who use computer based technologies may provide the catalyst that will provoke other women to network and share their experiences using this technology in schools and in their daily lives. Our society is dependent on the full development of human resources for economic growth and future prosperity. This potential talent cannot be lost because of the subtle exclusion of women from learning and teaching about computer based technologies.

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